

The Secrets and Wonders of Muck Swamp

David C. Shelley and Dr. Art Cohen, Department of Geological Sciences, USC

If you look on current maps of the park, you'll see that the low-lying, swampy area off the boardwalk near Harry Hampton Visitor's center is called Muck Swamp. This fascinating area, with its mysterious, cool, damp air and majestic trees makes a powerful first impression on many visitors starting down the boardwalk, and it still impresses many of us every time we visit. It's one of our favorite places in the park, but then again, we are probably biased by the fact that we have been lucky enough to study it for the last few years through the Department of Geological Sciences at the University of South Carolina. This swamp is basically a big stack of wet muck, including clay and peat (dead plant parts) that has been slowly accumulating for thousands of years and recording the history of Congaree along with it. With a little work, we are trying to decipher the record within these deposits about the *Paleoecology* (i.e. the study how to interpret past environments with regards to plants, animals, water table movements, river processes, etc.) of the area.

To back up a little bit, the "swamp" part of the name refers to the fact that the area is technically a *seepage wetland* or *groundwater rimswamp* near the northern valley bluff. This means that the groundwater table flowing "downhill," from the uplands in the north towards the river to the south, actually seeps out from the bluff (or at least close enough to the surface to count). Muck swamp gets a good dose of groundwater year-round because the river that carved this part of the bluff cut down into sands deposited across the upper coastal plain during the Upper Cretaceous – i.e. the time of the dinosaurs. These sands, which form a 600-foot thick layer underneath the park, contain abundant water that



This is a "core" sample from Zone 1.

seeps in the ground in areas of Richland County far to the north and flows to the south-southwest. Although the river only scraped into the top 20-30 feet of these deposits, deeper (>150-300 feet) wells in this same aquifer (i.e. the sand containing the water) are used by drinking water for visitors at the park as well as local residents. The water from this aquifer is also the reason that Cedar Creek flows so well (even when the rest of the floodplain may be dry) and may be why Weston Lake is so deep and open (but we're still studying that).

Plants (and potentially animals) in muck swamp don't fully rot because the high, stagnant water table in muck swamp won't let bugs, fungi and bacteria fully do their job. Such remains are at least partially preserved, resulting in the accumulation of "muck" over thousands of years. The muck is at least 10 feet thick; we don't have deeper data from muck swamp, but auger holes in other areas of the park suggest that there may be an additional 30 feet of sand and gravel below that. If you look closely (i.e. with a microscope), you can find all sorts of goodies in the

President's Corner



Dr. John Grego

Highway 601 Bridges

SC DHEC (Department of Health and Environmental Control) held a public hearing November 15 on the Highway 601 bridges project. As we have detailed in the newsletter over the past year, the current bridging of the Congaree floodplain includes almost 2 miles of embankment. The proposed bridging would include just as much embankment with additional filling of wetlands. Friends has advocated that the floodplain be bridged for its entire length, restoring flow across the floodplain during high water.

This was a public hearing on SC DOT's (Department of Transportation) application for a Water Quality Certification permit to fill wetlands. I know this sounds like a narrow technical issue, but actually many factors need to be considered in issuing the permit, including all potential water quality impacts of the project and whether feasible alternatives to the project exist.

Approximately 25 people attended the public hearing, while 8 people spoke, all of whom requested that SC DHEC deny the permit. Nena Rice and I spoke on behalf of Friends, while Dick Watkins represented the South Carolina Wildlife Federation, Prof. Dan Tufford spoke on behalf of the SC Audubon Society. Jimmy Chandler from the South Carolina Environmental Law Project, Bob Guild from the SC Sierra Club, and Gudrun Thompson from the Southern Environmental Law Center provided a legal perspective on the permit application.

Significantly, Bill Hulslander, the resource manager at Congaree National Park, spoke of the Park Service's obligation to be a good steward of park resources in opposition to the permit application and the mitigation plan SC DOT has put forward.

DHEC will receive additional public input until December 15. The Friends advocacy committee will

file additional comments and we certainly encourage members of Friends to provide written comments as well. Visit the Friends website for more information on how you can help. As Jimmy Chandler noted, if the state's own agencies are allowed to fill wetlands in a National Park, what won't we allow?

Outstanding Resource Waters

SC DHEC has started the process of amending SC Regulation 61-69 by reclassifying the Park's waters (rivers, creeks, lakes, ponds, guts, sloughs, wetlands,...) as Outstanding Resource Waters (ORW), with Cedar Creek downstream from Wise Lake classified as Outstanding National Resource Water (ONRW).

Friends of Congaree Swamp feels that more of the Park's waters are eligible for Outstanding National Resource Waters classification, but has chosen to support DHEC's amendment as it stands.

Though South Carolina has numerous Outstanding Resource Waters on the coast and in the mountains, no piedmont waters have been so designated; Congaree National Park's waters would be the first Outstanding Resource Waters in the piedmont. South Carolina currently has no Outstanding National Resource Waters; SC DHEC feels that Cedar Creek's value as a natural and recreational resource makes it an excellent candidate for the first Outstanding National Resource Water in the state.

Members of Friends attended a stakeholder's meeting on September 14 and wrote a letter in support of the amendment, along with Columbia Audubon Society, Audubon South Carolina, South Carolina Wildlife Federation and private citizens. Industry groups are studying the proposal and have asked for more information, though their primary interest was in the Congaree River, which is not being reclassified. At the meeting, DHEC staff stressed that the reclassification should not affect current upstream discharge permits.

SC DHEC's Board has approved the Notice of Proposed Regulation. We will keep you notified of upcoming opportunities for public input.

Saying Goodbye to a Friend

Superintendent Martha Bogle Ends 10-year Tenure



Superintendent Martha Bogle ended her 10-year tenure at Congaree National Park in September. Martha has been appointed Assistant Superintendent of Blue Ridge National Parkway and will be based in Asheville, North Carolina. In spite of the title, this is a promotion, as Blue Ridge Parkway is one of the most visited Parks in the Eastern United States. Martha recently completed constructing a new home in Asheville and her promotion could not be more timely.

Martha oversaw unprecedented changes at Congaree. She will always be remembered for managing construction of the new entrance, National Park Road, by the Army and Air National Guard, and construction of the Harry Hampton Visitor Center by Air National Guard civil engineering units. These novel and innovative partnerships saved the National Park Service millions of dollars in construction costs and brought Martha and Congaree staff recognition within the Park Service.

Martha's other signal achievement was the transition of the park from Congaree Swamp National Monument to Congaree National Park in November 2003. National Park status had been a far-off goal in many park advocates' minds, but the impending retirement of Senator Ernest Hollings brought the issue to the forefront. The change to National

Park status and the accompanying 4600-acre boundary expansion have created a wealth of new opportunities for Congaree Swamp.

Research funding and activity increased greatly during Martha's tenure. Martha oversaw construction of the Center for Old Growth Bottomland Forest Research and Education (the Learning Center), and has worked with the Southeast and South Atlantic Cooperative Ecosystem Studies Units (CESU's) to expedite research projects fundamental to the Park's management. Under CESU agreements, Congaree National Park can fast-track research projects with universities that are CESU members; researchers at Clemson University and the University of Georgia have worked with the Park under CESU partnerships. Until recently, however, the University of South Carolina did not belong to a CESU; Martha was a member of the team that gained USC membership in the South Atlantic CESU; this has led to promising new projects at the Park.

The timeframe of Martha's departure precluded a reception for all Friends members, but Board members sponsored a reception for Martha at Harriott Hampton Faucette's house on September 7. At the reception, we presented Martha with a framed photograph of the Low Boardwalk by photographer Nicholas Moore, a contributor to "Images of Congaree National Park". The photo was inscribed:

*In Appreciation to
Martha Bogle
for all you have done for
Congaree National Park.
Friends of Congaree Swamp
2005*

Friends members Dick Watkins, Harriott Hampton-Faucette, and John Grego spoke in recognition of Martha's successful service at Congaree National Park. "

Members of Friends should have a chance to wish Martha well at the Art Museum reception on December 10 as she plans to attend. This will be a great opportunity to thank her for her work at Congaree and wish her well in her new position.

Stephen Clark

Stephen Clark is serving as Interim Superintendent of Congaree National Park. He is currently Chief Law Enforcement Officer at Virgin Islands National Park on St. John, and has served at 7 other parks in his 20-year career, including Delaware Water Gap National Recreation Area, Allegheny Portage Railroad National Historic Site, Johnstown Flood National Memorial (he's from Pennsylvania), and Virgin Islands Coral Reef National Monument. Stephen is married and has 3 daughters.

Stephen accepted an interim appointment for 30 days, though his stay could be extended to 3 months. While at the Park, he will be assessing Park needs from his perspective. Given his background, Stephen naturally commented on the lack of law enforcement at the Park, and expressed interest in increasing the profile of the Park, and improving awareness of the rich cultural history of the Congaree Swamp area.

Congaree River Boat Trip: Bald Cypress Reflections

John Cely distributed the following article at the Friends boat trip on September 24, 2005.

Bald cypress – the wood eternal and patriarch of southern trees - is at the center of the Congaree National Park story. The Beidler family of Chicago came south in the late 1800s for the same reason many other timber concerns of that era did – to log the magnificent old growth cypress groves that still dotted southern rivers and swamps. Outside of the Mississippi Delta, the Santee River and its two main arteries, the Congaree and Wateree, featured the most extensive stands of virgin cypress in the South, and it was for good reason that the Beidler's called their corporation the "Santee River Cypress Lumber Company."

Over a period of about 25 years, the Beidlers acquired 130,000 acres of South Carolina river swamp for the purchase price of about a dollar an acre (no doubt a cheap price, even back when a dollar was worth something; the locals, however, thought the idea of removing cypress logs from the vast muddy swamps of the Santee a laughable proposition).

In 1888, a mill was erected on the banks of the Santee River at the community of Ferguson, in lower Orangeburg County (and now under Lake Marion), and dozens of local lumber camps were established around the edges of the Congaree-Wateree-Santee Rivers. At its production height, the Ferguson Mill employed up to 400 people, had its own hospital (malaria was still prevalent), churches, and even issued company script.

Cypress was cut with a crosscut saw by two men standing on a "springboard;" the cut was made above the buttress and once felled, the tree was cut into 16 foot sections; many of the virgin cypresses were "five-log trees." When the winter rains came and the swamp flooded, the logs were floated out to the river where they were tied into rafts and sent downstream to the mill. The loggers learned, however, that recently cut "green" cypress does not float – many of these sinkers, some covered with 100 years of silt – can still be found scattered throughout the Park. They later sent in a crew of tree girdlers that girdled the cypress with axes, effectively killing the tree and making it light enough to float when it was cut down 9-12 months later.

In the pre-treated lumber-creosote era, cypress was one of the most valuable trees because it was almost indestructible – the wood of choice for construction

projects exposed to the elements – railroad ties, piers, pilings, bridges, shingles and other such uses. Also important in the era before power tools was that cypress was a soft wood and easy to work and shape.

Cypress resistance to rot is legendary. It was used for water lines in cities like New Orleans; some of these wooden lines were still sound after being underground for more than 100 years. Cypress shingles can last 100 years. A cypress grave marker found in Charleston was still solid 140 years after being made.

Millions of board feet of virgin Congaree-Wateree-Santee cypress were removed before the Ferguson mill finally closed in 1915. It was not a financial success, with frequent shut downs due in part to an oversupply of lumber. Cypress logging was also much more expensive than high ground logging. But unlike most logging operators, the Beidlers held on to the land after it had been cut-over, knowing that one day the trees would grow back.

In the early 1950s, Henry Savage, a prominent Camden attorney and historian, tracked down Fred Seeley, the former manager of the Ferguson Mill. The resulting correspondence, deposited in the South Caroliniana Library, is an interesting read.

Loggers of that era took only the best cypress – hollow and crooked trees were left behind, which makes perfect sense when considering the amount of labor it took cutting down a six or seven foot diameter tree by hand. Fortunately, enough cypress survivors were left behind at Congaree to provide a tantalizing glimpse of what the great virgin stands must have looked liked 100 years ago.

Bald cypress (the name comes from the fact that it is one of the few coniferous trees that sheds its needles in winter) is by far the oldest tree in eastern North America (they are first cousins of the famous California redwoods). Many of the logs that went through the Ferguson Mill were between 500-700 years old but one log had 1600 growth rings! This may sound suspiciously high but recently a dendrochronologist at the University of Arkansas aged some cypress, using an increment borer, at Audubon's Francis Beidler Forest and found one tree that was 1500 years old.

We still don't know the function of the famous

Events in Review

cypress “knees”, except to make table lamps. The once popular theory of providing oxygen to the root system has been discarded. Generally, the wetter the environment, the more prevalent knees become. Cypress can grow quite well on upland soils, as long as the soils are not too dry, and produce few, if any, knees.

Knee height is often related to dramatic water fluctuation; the tallest knee I’ve found at Congaree is about 7 feet. Knees are protrubances from the root system and never become trees.

Although cypress can live for years submerged in

water, the seeds must have dry, or moist soil, in order to germinate; therefore cypress cannot regenerate itself in permanently inundated swamps and water bodies.

Contrary to popular opinion, cypress is not a slow-growing tree, especially if the young trees get a fair amount of sunlight.

The state champion cypress is 26 feet in circumference at diameter-breast-height and 131 feet tall; the national champion cypress, located in Louisiana, is 53 feet in circumference (no doubt one with several branching trunks!) but only 83 feet tall. The tallest cypress measured in Congaree is 148 feet tall – the one pictured in the Visitor’s Center with Harry Hampton standing next to it.

There is no way of knowing how old the state champion is based on visual observation but based on its size, it could be approaching a thousand years or even older. It is a humbling experience to stand within the shadow of this tree.

The use of cypress in the landscaping trade has been advocated by leading horticulturists and landscape architects. To see a handsome cypress “allee,” the next time you go to the beach via Hwy 521, go straight through Greeleyville (remember Greeleyville is a notorious speed trap), rather than staying on 521, and proceed on state road 375; just a couple of miles on 375 on your left you will see a nice brick home set back a little off the road with a double avenue of cypress lining the drive.

For my retirement, my colleagues presented me with the finest gift



It takes seven people to reach around this State champion cypress: 131 ft tall and 26.5 ft in circumference.

Photos by Joe Kegley



This hollow tree is 26 ft around. It is impressive because it doesn’t have much of a buttress and grows straight up out of the ground. Much of its top has been lost over the years, so it doesn’t have championship status.

Champion Tree Walk

Carol Kososki

On September 24, 2005 an eager group of Friends of Congaree enjoyed a beautiful, fall afternoon on a boat excursion/big tree walk led by John Cely. Two boats, piloted by John Cely and Jeff Kososki, were used to transport the visitors along the Congaree River to a jumping-off point on the eastern end of the Park. The boat trip was followed by a trek through remote areas of Congaree National Park to experience some of the awesome, record-holding bald cypress trees for which the Park is famous. The trees varied from sixteen to twenty-six feet in circumference. Another short ride upriver took us to the State champion cypress: 26.5 feet in circumference and 131 feet tall. This tree could easily be 1000 years old if not older.

imaginable – a six foot, potted cypress sapling that I planted in my backyard.

Cypress mulch has become very popular in the landscaping trade. Unfortunately, rather than being a by-product, much of this mulch is coming from Florida and other places where they are clear-cutting entire cypress stands just for mulch. Florida Audubon Society is taking a hard look at this but you can help by not using cypress mulch and spreading the word to your friends.

Upcoming Field Trips & Events

Cedar Creek Canoe/Kayak Trip

Saturday, February 25, 2006

10 AM-2 PM

The River Runner Outdoor Center will be sponsoring a canoe/kayak trip Cedar Creek for Friends of Congaree Swamp. Cedar Creek meanders through the floodplain for most of the length of Congaree National Park. Depending on our route, we will have the opportunity to visit Dawson's Lake, a widened bend in Cedar Creek, or see a champion persimmon tree. Travelling by canoe or kayak often provides the best opportunity to see wildlife in the Park.

We will leave from South Cedar Creek Landing and travel either upstream or downstream depending on creek conditions. This is an out-and-back trip, so there will be some paddling against the current. While not overly strenuous, the paddling will be somewhat more difficult than we encountered on the Bates Old River trip.

We will meet at 10 at the after-hours parking lot on National Park Road and then carpool to South Cedar Creek landing. Costs will be \$40 for canoe/kayak rental, while the trip will be free for those who provide their own boat. This trip is limited to the first 15 people to sign up. Call Guy Jones at (803) 771-0353 for reservations.

Congaree Swamp Christmas Bird Count

Sunday, December 18, 2005

7:00 AM — After-hours parking lot

Each year since 1900, bird enthusiasts have been conducting Christmas Bird Counts in North America. A Christmas Bird Count (or CBC) is an all-day effort to find and identify as many wild birds as possible within a 15-mile diameter circle. This effort, which now engages over 50,000 participants annually, is sponsored by the National Audubon Society. Results may be viewed at <http://www.Audubon.org/bird/cbc>. We have a CBC for the Congaree Swamp (founded by Robin Carter) that includes most of the national park and adjacent areas, from just north of Gadsden to just north of St. Matthews. Join us to help out. You do not have to be a birder, just someone who wants to help and is willing to walk a few hours on the park trails. Meet at the after-hours parking lot at 7:00 AM on Sunday, December 18, 2005. You may help out as long as you like. Many participants just help out for a few hours, but some will stick it out all day. There is a \$5.00 participation fee that goes to the National Audubon Society to help cover the costs of processing the data. If you have any questions please contact Robin Carter at 782-8820 or email to rcarter@sc.rr.com.

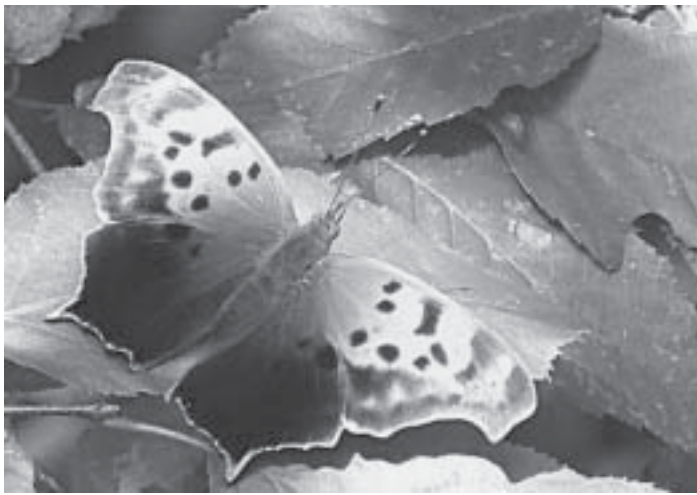


Photo by Virginia Winn



Photo by Leo Rose



Photo by Joseph Kegley



Photo by Doug Gardner

Art Museum Reception

Come join Friends of Congaree Swamp and Carolinas' Nature Photographers Association on Saturday, December 10 from 2 to 4 PM at the Columbia Art Museum for a reception to acknowledge contributors to "Images of Congaree Swamp". At 2:30, we will have a ceremony to acknowledge the book committee, photographers and sponsors of "Images of Congaree Swamp." Complimentary wine and snacks will be served. Be sure to come and acknowledge all those who worked hard on this effort.

To coordinate with the October 21-December 31, 2005 exhibit "Contemporary Photography and the Garden: Deceits and Fantasies", the Art Museum sought a community group not traditionally associated with the arts to organize a concurrent exhibit in the Community Gallery on the second floor. Carolinas' Nature Photographers Association brought our participation in the book project to the attention of Art Museum staff, and the Art Museum felt Friends would be a perfect partner for the exhibit.

Our exhibit will be on display from December 8 to January 6, with plans to exhibit afterwards at other galleries in the Carolinas. We would especially like to thank Swearingen Ecology Associates, US, Inc. for fully sponsoring the exhibit.

Friends Annual Meeting

Big Lake Hunt Club Hosts Annual Meeting

The Friends had beautiful weather for their Annual Meeting at the Big Lake club; the mosquitoes liked it too. We would like to thank Joe Edens for hosting the event, and Robert Stroman for all the help he provided in preparing for the event.

We never did actually visit the eponymous Big Lake, but our field trips converged on an impressive sand bar on the Congaree River. Robin Carter led a bird walk, while Julie Wilking led a botany tour; both groups observed Texan Crescent butterflies (which are neither birds nor plants) on their walk, a species rarely observed in Richland County. The dry fall weather has been a mixed blessing, but one good outcome was the possibility for paddling. Guy Jones from River Runner had kayaks and canoes waiting for members at the sandbar for short forays in the river.

The Friends annual meeting started with recognition of Park personnel in attendance, including John Torrence, Marcus Hutchins, Fran and Elizabeth Rametta, and interim Superintendent Stephen Clark. We also acknowledged visitors Michael and Debra Hollings. We then discussed an upcoming DHEC public hearing for the Highway 601 bridges over the Congaree River, a reception to celebrate the photography exhibit at the Columbia Art Museum, and other imminent Friends events.

The proposed list of Board members for the Friends of Congaree Board was presented. Current Board members LaBruce Alexander, Carolyn Hudson, Mary Kelly, Carol Kososki, Eleanor Niestat, and Virginia Winn had earlier agreed to serve new 3-year terms if elected. After a brief introduction of each Board member, Friends unanimously voted to re-elect them to the Board.

Harriott Faucette then made the presentation of the Order of the Cypress to Senator Ernest F. Hollings; his son Michael accepted on his behalf. Harriott outlined Senator Hollings' many major contributions to Congaree National Park, including the initial legislation to create Congaree Swamp National Monument and provide funding for land acquisition in 1976, the 1988 legislation for boundary expansion and funding for land acquisition, and the 2003

legislation for National Park designation, boundary expansion and funding for land acquisition.

Our guest speaker, Chris Judge, serves as archaeologist for the Heritage Trust program at SC Department of Natural Resources. Chris discussed many of the most pressing questions anyone who has ever found a piece of Indian pottery or an arrowhead would want to ask. In addition, he placed the Congaree Indians and their culture in a local, regional, and national context.

After Chris' talk, very hungry groups of Friends either gathered around tables for Ben Moise's roast oysters, or retired to the picnic shelter for fried chicken, butternut squash soup, roasted vegetables, and desserts provided by Friends Board members. A final thanks to Bob Render, who helped with the arrangements, catering, set-up and breakdown, Mary Kelly, who supervised registration, and Carol Kososki, who provided centerpieces.

Ernest Hollings' son Michael, accepts the *Order of the Cypress* on his father's behalf at the Friends business meeting, while Friends members watch.



Photos by Virginia Winn



2,395 acres added to Congaree National Park

November 16, 2005 became a day to remember. The Trust for Public Land purchased the 2,395-acre Bates Fork tract from Santee River Limited Partnership (the Beidler family), and promptly conveyed ownership to the National Park Service for addition to Congaree National Park.

This tract is bounded on the east by the Wateree River, on the south by the Congaree River, on the west by US Highway 601, and bounded on the northwest by Bates Old River. The tract is part of the 4,576-acre boundary expansion which Congress authorized in 2003 when Congaree Swamp National Monument became Congaree National Park.

Efforts to acquire the Bates Fork tract began in 1994, when Richard Watkins contacted Francis Beidler III about selling this tract for addition to Congaree Swamp National Monument. Their dialogue led to L. L. Gaddy's biological reconnaissance survey of the tract, arranged by The Trust for Public Land and funded by Mark and Nancy Kinzer. But, for several reasons, timing in 1994-95 was not ideal to pursue acquisition of the Bates Fork tract for addition to the National Monument.

Efforts resumed in 2002, after it was learned that the Beidler family had decided to sell this tract. About that same time, Senator Ernest Hollings had expressed interest in establishing a National Park in South Carolina. Sen. Hollings was contacted by the Congaree Land Trust and Friends of Congaree Swamp about availability of the Bates Fork tract. Friends of Congaree Swamp also emphasized the adjoining Riverstone tract.

In May 2002, The Trust for Public Land (TPL), a national non-profit private land conservation organization, was contacted by Friends of Congaree Swamp. Agreeing to help, TPL selected Chrisanne Mitchell, a Senior Project Manager in North Carolina, to work on the Congaree project. She and TPL had worked previously on Congaree. TPL's Washington DC staff was another key component – extraordinarily well-situated to work with Sen. Hollings' staff.

In June 2003, Sen. Hollings and Congressman James Clyburn introduced their bills to expand the authorized boundary of Congaree Swamp National Monument and change Congaree's designation to National Park. Thereafter, the 4,576-acre boundary

expansion authorization and National Park designation were included in a bill which became law in November 2003.

Also in November 2003, efforts were initiated to determine fair market value of the Bates Fork tract. The appraisal process was eventually completed in 2005, after which the Beidler family agreed to sell the tract to TPL at the appraised value.

Meanwhile, in November 2004, Sen. Hollings had secured an appropriation of \$6 million to purchase land for Congaree National Park. This funding was crucial to purchase the Bates Fork tract.

After completion of further procedural steps in the acquisition process, The Trust for Public Land purchased the Bates Fork tract from the Beidler family on November 16, 2005. TPL immediately conveyed ownership to the National Park Service for addition to Congaree National Park.

Clean-up Is Always in the Works at the Park

John Grego, Darryl Williams, and Bob Render take time out of their clean-up on November 19 to visit the Hampton Cypress.



muck – pollen, charcoal dust, fungal (mushroom) spores, fecal pellets (bug poop), and plant fragments. Pollen – yes, like the same stuff that gets on your car in the spring, or makes you sneeze in the fall and spring – is actually very important because it acts as a “fingerprint” that can be used to identify plants down to species level in many cases. Pollen doesn’t break down easily, and can be isolated by “digesting” a bulk sample in a series of chemicals. Charcoal can indicate the presence of fires, while fungi and fecal pellets (bug poop) indicate that conditions were dry enough to let Mother Nature’s garbage disposal crew do more work. Plant fragments, such as cells from roots and leaves, give clues about what was growing there and how things started to rot. The bulk sediment can be studied using a technique called “oriented microtome analysis,” which was developed over 25 years ago by Dr. Art Cohen. We take peat samples, embed them in wax, and make thin slices of them to look at under a microscope. This is very much the same technique that doctors use to look at human tissue biopsies.

By sampling the peat and pollen at different levels, we can see how these different “goodies” stacked up over time, and interpret what the area was like in the past. Based on our studies, we can identify four broad zones within the deposit underneath muck swamp. Starting at the bottom and working upward, these include the following:

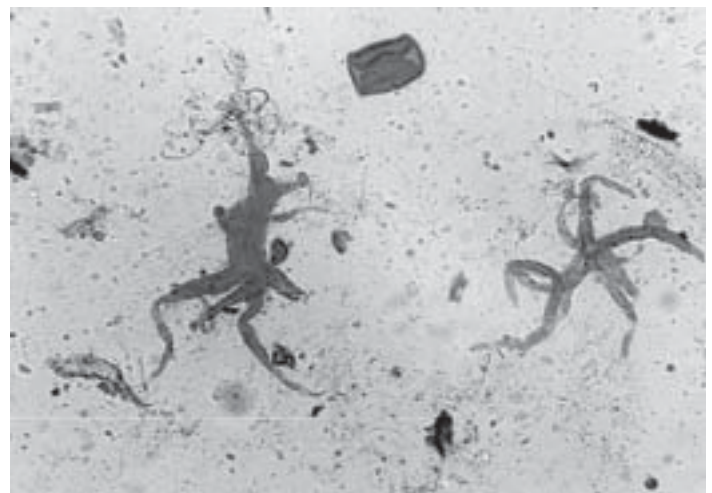
1. Zone 1, the deepest part, contains fragments of water lilies, algae, and diatoms that tell us that muck swamp used to be pond. We have interpreted this to be an ox-bow lake, much like Weston Lake, that formed in the channel that carved the northern valley bluff. A sample of peat from this age gives a date of 21,000 years, which was during the last ice age. An ice age date is also supported by pollen, which indicate cold weather plants such as spruce trees and an evening primrose related to the modern state flower of Alaska!

2. Zone 2 contains no spruce pollen, but is marked by an increase in oak, chestnut, hickory, and walnut, as well as charcoal dust. These and other data indicate a change from the

open water lake to a shallow, open marsh. We don’t have any radiocarbon dates yet, but several factors indicate regional climate change to a slightly warmer climate with different seasons. The top of this zone is marked by more clay, which we interpret to be an old soil horizon that formed over several thousands of years.

3. Zone 3 contains organic material that gives a radiocarbon date of ~3,500 years. The pollen in this zone indicate an increase in pines, sweet gums, alders, and maples as well as the beginning of trees indicative of southern swamps we know today, such as tupelo, cypress, and magnolia. Pollen from herbs, combined with an increase in fungal remains and charcoal, are interpreted to reflect a relatively un-shaded environment with alternating wet and dry periods.

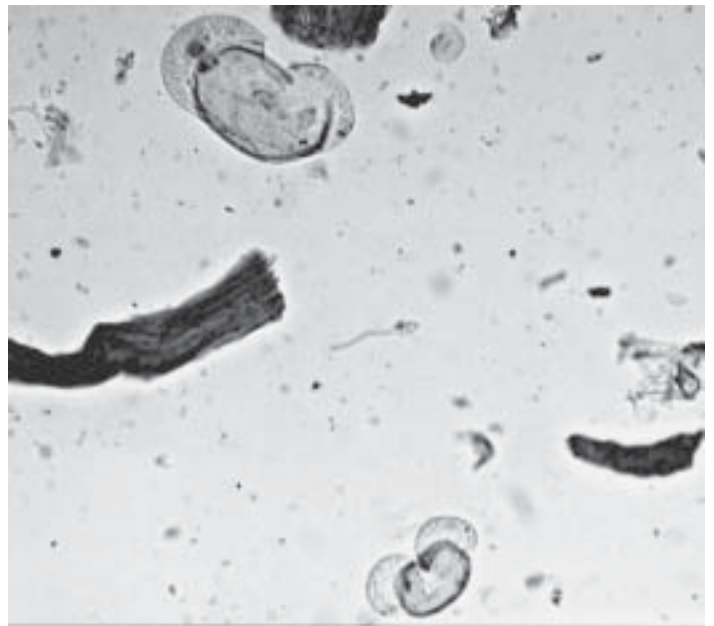
4. Zone 4, near the top of the deposit, contains pollen that indicate a plant assemblage like we see today in many of the warm-temperate, coastal plain river swamps of the Southeast. The sparse occurrence of a few pollen from agricultural crops in the basal part of Zone 4 (about 70-80 cm) suggests some human (pre-European settlement?) impact. The uppermost 16 cm contain a sudden increase in pollen from Swamp Tupelo (which dominates the area today) as well as abundant clay. We



This is a picture from the microscope showing Palynofacies ideoblasta, which are structures (leaf hair bases) from water lily material in Zone 1.

still don't have dates, but these changes suggest that the area is radically different today than it was a few hundred years ago. These changes are probably due to post-European settlement human impacts.

That currently is where we are, but we are still doing more sampling and analysis to address some questions about human impacts and timing of the changes. We are also working with the South Carolina Department of Natural Resources Geological Survey to map the deposits of the floodplain and the region far beyond muck swamp, which will tell a more complete story of the area we call Congaree. We are willing to share more details with anyone who is interested and always on the lookout for volunteers to help out, especially in the field, so please feel free to call us if you are interested in this research. Thank you for your time and interest!



This is a sample from Zone 1 showing pine pollen (the smaller "Mickey Mouse" shaped grain in the lower center) and spruce pollen (the larger "Mickey Mouse" shaped grain in the upper center). The dark flecks are small charcoal fragments, and the other material is plant debris.



Fran Rametta, left, tells a group of Park visitors about the importance of "muck" research.
Photos by Virginia Winn





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www.friendsofcongarree.org

Fall 2005

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and its unique environment.**

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Yes, I would like to support conservation of Congaree Swamp for future generations. Enclosed is my tax deductible contribution of \$ _____. Please make your check payable to Friends of Congaree Swamp.

_____ \$ 15.00 Individual _____ \$ 50.00 Advocate _____ \$ 500.00 Benefactor _____ \$ 50.00 Nonprofit Org.
_____ \$ 35.00 Family _____ \$ 100.00 Partner _____ \$ 1000.00 Patron _____ \$ 1000.00 Corporate
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_____ Public Relations _____ Membership
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_____ Events _____ Newsletter
_____ Research _____ Other: _____

In addition to my membership, I would like to give \$ _____ as a donation to Friends of Congaree Swamp:
In Memory of: _____
In Honor of: _____
As a Gift Membership to: _____

Please provide contact information so we can inform the person or family:
Name: _____
Address: _____
City: _____ State: _____ Zip: _____

I would like to order the following items (proceeds benefit FCS projects): \$ _____ enclosed.
_____ copies of the beautifully detailed **"Map of Congaree National Park and Vicinity"** @ \$12.95 each/plus \$3.50 s/h
_____ copies of **"Images of Congaree Swamp,"** a 64 page, full color, photographic book of the park @ \$10 each/plus \$2.50 s/h

Thank You For Supporting Friends of Congaree Swamp!
Friends of Congaree Swamp, PO Box 7746, Columbia, SC 29202-7746
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